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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,675	12/11/2003	William R. Trutna JR.	1000484-01	8969

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EXAMINER	
AGHDAM, FRESHTEH N	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
09/04/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/733,675	TRUTNA ET AL.	
	Examiner	Art Unit	
	FRESHTEH N. AGHDAM	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 11-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 11-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed June 3, 2008 have been fully considered but they are not persuasive.

Applicant's Arguments:

Regarding claims 1-6 and 11-19, page 9, the applicant argues that Sudo does not teach or suggest the claimed subject matter of "allocating coded signals corresponding to the same bit of the spreading codes to a respective one of a plurality of transmission channels".

Regarding claims 1-6 and 11-19, page 10, the applicant argues that the claimed subject matter of "summing the coded signals allocated thereto to generate a modulation signal".

Examiner's Response:

Regarding the first argument set forth above, the examiner disagrees with the applicant because Sudo clearly teaches allocating coded signals corresponding to the same bit of the spreading codes to a respective one of a plurality of transmission channels (col. 1, lines 57-64).

Regarding the second argument set forth above, the examiner disagrees with the applicant because, as it was discussed in the previous office action dated March 6, 2008, one of ordinary skill in the art would recognize it is obvious that assigning/ allocating the coded signals corresponding to the same bits of the spreading codes to a transmission channel is obtained by summing the coded signals allocated thereto. In

other words, in order to allocate a plurality of bits or symbols to a transmission channel those bits or symbols are summed as it is evidenced for example by Dent (Fig. 1, means 24; Fig. 2, means 58; Col. 6, lines 4-22).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (US 6,839,335), further in view of Dent (US 6,680,928) and Hoang et al (US 2004/0246973).

As to claim 1, Sudo discloses a method of and an apparatus for transmitting information signals via multiple transmission channels comprising: encoding each information signal with a respective spreading code to generate a coded signal corresponding to each bit of the spreading code, the spreading codes are mutually different (Fig. 1, means 1 and spreading codes 1-n; Col. 1, Lines 28-34); allocating the coded signals corresponding to the same bit of the spreading codes to a respective one of the transmission channels (Fig. 1; Col. 1, Lines 57-64). Sudo does not expressly disclose in each of the transmission channels, analog summing the coded signals allocated thereto to generate a modulation signal; and generating an optical transmission signal in response to the modulation signal. One of ordinary skill in the art

would recognize it is obvious that assigning/ allocating the coded signals corresponding to the same bits of the spreading codes to a transmission channel is obtained by summing the coded signals allocated thereto. In other words, in order to allocate a plurality of bits or symbols to a transmission channel those bits or symbols are summed as it is evidenced for example by Dent (Fig. 1, means 24; Fig. 2, means 58; Col. 6, lines 4-22). Also, one of ordinary skill in the art would recognize that the summation could be performed digitally or in analog domain, wherein the analog summer is advantageous since it is typically smaller than its digital counterpart. Hoang discloses that wavelength division multiplexing is a form of frequency division multiplexing and the carrier frequencies could be replaced by carrier wavelengths (Par. 11). Therefore, it would have been obvious to one of ordinary skill in the art to transmit first bits of plurality of encoded information signals on the same wavelength subcarrier instead of frequency subcarrier and so forth as taught by Hoang in order to rapidly convey large amount of information between two points with very low loss by utilizing an optical transmission scheme.

As to claim 2, Sudo further discloses that the spreading codes are orthogonal (Col. 1, Lines 28-34).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Hoang et al, further in view of Shattil (US 2002/0150070).

As to claim 3, Sudo, Dent, and Hoang teach all the subject matter claimed in claim 1, except for the spreading codes are mutually quasi-orthogonal. One of ordinary

skill in the art would recognize that different types of spreading codes such as orthogonal and quasi-orthogonal spreading codes could be utilized depending on the design requirements, wherein each one has an advantage and a disadvantage, for example generally quasi-orthogonal codes are not preferred over orthogonal codes because of the issue of interference; in contrast, quasi-orthogonal codes are less restricted since more quasi-orthogonal codes can be generated comparing to orthogonal codes as it is evidenced by Shattil (US 2002/0150070).Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Shattil with Sudo, Dent, and Hoang for the reason stated above.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Hoang, further in view of van der Gracht et al (US 4,835,517).

As to claims 4-5, Sudo, Dent, and Hoang teach all the subject matter claimed in claim 1, except for spreading comprises exclusive-NORing each information signal with the bits of the respective code. One of ordinary skill in the art would clearly recognize that it is well known in the art to perform multiplication utilizing either XOR or XNOR logic gates, wherein the spreading code comprises a plurality of bits as it is evidenced by van der Gracht (Col. 4, Lines 47-48). Therefore, it would have been obvious to combine the teaching of van der Gracht with Sudo, Dent, and Hoang in order to spread the information signal by multiplying the information signal by a spreading code.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Hoang et al, further in view of Balachandran et al (US 7,187,715).

As to claims 6, Sudo, Dent, and Hoang teach all the subject matter claimed above, except for each spreading code comprises bits each in one of a first state (i.e. +1) and a second state (-1); and the encoding comprises for each bit of the spreading code in the first state, outputting the information signal as the coded signal corresponding to the bit of the spreading code; and for each bit of the spreading code in the second state, inverting the information signal and outputting the inverted information signal as the coded signal corresponding to the bit of the spreading code. One of ordinary skill in the art would recognize that it is well known in the art to spread the information signal, wherein each spreading code comprises bits each in one of a first state (i.e. +1) and a second state (-1); and the encoding comprises for each bit of the spreading code in the first state, outputting the information signal as the coded signal corresponding to the bit of the spreading code; and for each bit of the spreading code in the second state, inverting the information signal and outputting the inverted information signal as the coded signal corresponding to the bit of the spreading code as it is evidenced by Balachandran (Fig. 5, parts b and c). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Balachandran with Sudo, Dent, and Hoang in order to spread the information signal to be transmitted by multiplying each bit of the information signal with the corresponding bit of the spreading code in order to reduce power consumption in the communication system.

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (US 6,839,335), further in view of Dent and Ahn et al (A Symmetric-Structure

CDMA-PON System and Its Implementation, IEEE PHOTONICS TECHNOLOGY LETTERS, VOL. 14, NO. 9, SEPTEMBER 2002).

As to claim 11, Sudo discloses a method of and an apparatus for transmitting information signals via multiple transmission channels comprising: encoding each information signal with a respective spreading code to generate a coded signal corresponding to each bit of the spreading code, the spreading codes are mutually different (Fig. 1, means 1 and spreading codes 1-n; Col. 1, Lines 28-34); allocating the coded signals corresponding to the same bit of the spreading codes to a respective one of the transmission channels (Fig. 1; Col. 1, Lines 57-64); and modulating the coded signals on each channel (Fig. 1, means 4). Sudo does not expressly disclose in each of the transmission channels, analog summing the coded signals allocated thereto to generate a modulation signal; and a transmitter comprising a modulation input connected to the output of the analog summer. One of ordinary skill in the art would recognize it is obvious that assigning/ allocating the coded signals corresponding to the same bits of the spreading codes to a transmission channel is obtained by summing the coded signals allocated thereto. In other words, in order to allocate a plurality of bits or symbols to a transmission channel those bits or symbols are summed as it is evidenced for example by Dent (Fig. 1, means 24; Fig. 2, means 58; Col. 6, lines 4-22). Also, one of ordinary skill in the art would recognize that the summation could be performed digitally or in analog domain, wherein the analog summer is advantageous since it is typically smaller than its digital counterpart. Ahn discloses employing a WDM-CDMA transmitter, wherein the output of the CDMA signal is inputted to an optical transmitter

comprising a modulation input (Fig. 1, wherein the output of the combiner is modulated in the optical transmitter) in order to suppress the optical beat noise (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Ahn with Sudo and Dent for the reason stated above.

As to claim 12, Sudo further discloses that the spreading codes are orthogonal (Col. 1, Lines 28-34).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Ahn et al, further in view of Shattil (US 2002/0150070).

As to claim13, Sudo, Dent, and Ahn teach the entire subject matter claimed in claim 1, except for the spreading codes are mutually quasi-orthogonal. One of ordinary skill in the art would recognize that different types of spreading codes such as orthogonal and quasi-orthogonal spreading codes could be utilized depending on the design requirements, wherein each one has an advantage and a disadvantage, for example generally quasi-orthogonal codes are not preferred over orthogonal codes because of the issue of interference; in contrast, quasi-orthogonal codes are less restricted since more quasi-orthogonal codes can be generated comparing to orthogonal codes as it is evidenced by Shattil (US 2002/0150070). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Shattil with Sudo, Dent, and Ahn for the reason stated above.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Ahn et al, further in view of Way (US 2002/0021464).

As to claims 14-16, Sudo discloses utilizing frequency division multiplexing scheme to transmit information signals. Sudo, Dent, and Ahn are not explicit about the transmitter additionally comprises optical transmitter coupled to each transmission channel, wherein the output of the optical transmitters are connected to a multiplexer and the output of the multiplexer is coupled to a transmission medium that is optical fiber. Way discloses a type of frequency division multiplexing method comprising optical transmitters (Fig. 1, means 20) that are connected to a multiplexer (means 26), wherein the output of the multiplexer is coupled to a transmission medium that is optical fiber (means 16; Par. 3 and 27-29). Therefore, it would have been obvious to combine the teaching of Way with Sudo, Dent, and Ahn in order to rapidly convey large amount of information between two points with very low loss by utilizing an optical network instead (Par. 3).

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Ahn et al, further in view of van der Gracht et al (US 4,835,517).

As to claims 17-18, Sudo, Dent, and Ahn teach all the subject matter claimed in claim 1, except for spreading comprises exclusive-NORing each information signal with the bits of the respective code. One of ordinary skill in the art would clearly recognize that it is well known in the art to perform multiplication utilizing either XOR or XNOR logic gates, wherein the spreading code comprises a plurality of bits as it is evidenced by van der Gracht (Col. 4, Lines 47-48). Therefore, it would have been obvious to

combine the teaching of van der Gracht with Sudo, Dent, and Ahn in order to spread the information signal by multiplying the information signal by a spreading code.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo, Dent, and Ahn et al, further in view of Balachandran et al (US 7,187,715).

As to claim 19, Sudo, Dent, and Ahn teach all the subject matter claimed above, except for each spreading code comprises bits each in one of a first state (i.e. +1) and a second state (-1); and the encoding comprises for each bit of the spreading code in the first state, outputting the information signal as the coded signal corresponding to the bit of the spreading code; and for each bit of the spreading code in the second state, inverting the information signal and outputting the inverted information signal as the coded signal corresponding to the bit of the spreading code. One of ordinary skill in the art would recognize that it is well known in the art to spread the information signal, wherein each spreading code comprises bits each in one of a first state (i.e. +1) and a second state (-1); and the encoding comprises for each bit of the spreading code in the first state, outputting the information signal as the coded signal corresponding to the bit of the spreading code; and for each bit of the spreading code in the second state, inverting the information signal and outputting the inverted information signal as the coded signal corresponding to the bit of the spreading code as it is evidenced by Balachandran (Fig. 5, parts b and c). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Balachandran with Sudo, Dent, and Ahn in order to spread the information signal to be transmitted by multiplying each bit of

the information signal with the corresponding bit of the spreading code in order to reduce power consumption in the communication system.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRESHTEH N. AGHDAM whose telephone number is (571)272-6037. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Freshteh N Aghdam/

Examiner, Art Unit 2611

August 20, 2008

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611